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SURFACE MOUNT OPTOELECTRONIC COMPONENT

FIELD OF INVENTION

The invention relates to a surface mount optoelectronic component. The component is designed to be able to serve multiple modes of illumination[[;]], top, side, and bottom, depending on the method of mounting. ~~The mounting~~ Mounting connections are provided by [[the]] an inherent electrically conductive base material. No mechanical forming processes [[is]] are required to produce the desired mounting connection. The invention is also capable of higher heat dissipation due to the thicker base material [[used]] and [[the]] a heat sink incorporated into the design.

BACKGROUND OF THE INVENTION

In order to fulfill the different customers' requirements, different surface mount optoelectronic component configurations are available in the market today. Two key physical variations normally discussed for optoelectronic components are illumination direction and lead bending.

For illumination direction, customers may opt for either [[the]] a top or side illumination version. As the name implies, top illuminators have an illumination source on [[the]] a top portion of the optoelectronic component surface, while side illuminators have a source on [[the]] a side surface of the optoelectronic component. The choice depends very much on the application itself. However, each of these configurations is unique in terms of physical dimension and is not interchangeable. Customers are expected to order the specific type of configuration for their needs.

As for lead bending, common versions available in the market include [[the]] J-bend, gull-wing, reverse gull-wing, [[and]] etc. These are the configurations used for connecting the mounting connections [[onto]] to sub-systems, such as PCBs. Based on current market information[[;]], there are still no surface mount optoelectronic packages available that do not require mechanical forming processes to create the desired mounting connections.

BRIEF DESCRIPTION OF DRAWINGS

The drawings enclosed are as follows:

Figure 1A is a three-dimensional top view of the invention.

Figure 1B is a three-dimensional bottom view of the invention.

Figure 2 is a cross sectional view of the invention depicting [[the]] an assembly ~~consisting of~~ including a base material, a plastic housing, an optoelectronic chip, and a cavity within the plastic housing, which is filled by a transparent or translucent resin material.

Figure 3 shows the invention ~~being~~ mounted onto a PCB sub-system using [[the]] side protrusions as a means for electrical connection.

Figure 4 shows the invention ~~being~~ mounted onto a PCB sub-system, similar to Figure [[C]] 3, but on a reverse orientation so as to provide bottom illumination.

DETAIL DESCRIPTION OF THE INVENTION

The present invention relates to a surface mount optoelectronic component.

With reference to the invention, the optoelectronic component is based on [[the]] surface mount technology. A thick, electrically conductive material (1), preferably a metal frame, is used to serve as [[the]] a base material for the assembly. An opaque plastic material (2) is used to provide the housing for the whole component. A cavity (5) is designed within the plastic material. An optoelectronic chip (3) is mounted within this cavity. This cavity is filled with a hard transparent or translucent resin material so that optical radiation may be transmitted or received via this window. Electrical connection(s) between the optoelectronic chip (3) and the base material (1) is/are provided by a metallic wire (4).

Subsequent connections to [[the]] external sub-systems, such as PCBs, are provided by the base material (1) itself[[;]], typically by soldering. No extra mechanical forming processes are necessary to create the external connections. The base material (1) extends all the way from [[the]] a middle portion of the optoelectronic component to [[the]] a bottom surface (8), and to one of the side ~~walls~~ surfaces (7)~~; until the extend of~~, ultimately extending and protruding outside the plastic package. The bottom surface (8) ~~will be~~ is used for connection when a top illuminator is required. Alternatively, one of the side surfaces (7) could be used for connection [[if]] when the optoelectronic component is used as a side illuminator. This feature ultimately yields to a universal package design for optoelectronic components, where both the top and side illumination capabilities are combined into one single package. The base material can also protrude[[s]] to [[the]] other side[[s]] surfaces of the optoelectronic component, with protrusions

(6) formed in the side surface of the package [[(6)]]. These protrusions (6) act as heat sinks to improve heat dissipation from the optoelectronic component.

In another mounting configuration, ~~these~~ the side protrusions (6) can also be used as a means of connection to external surfaces, such as PCBs, as illustrated in Figures [[C]] 3 and [[D]] 4. In ~~this case~~ such a mounting configuration, the component ~~will sit~~ sits in[[to]] the sub-system ~~i.e. PCB~~ and can be used for either top ~~and also~~ or bottom illumination. This mounting configuration ~~will reduce~~ reduces the height profile of the optoelectronic component above the sub-system, since a portion of the optoelectronic component is below the sub-system's surface. The other two exposed surfaces (7) and (8) ~~will then~~ act as heat sinks ~~instead~~ when used in such ~~manner~~ mounting configuration.

Inherent in the design[[,]] is that no lead ~~forming is~~ formations are required since the external connections are provided by the base material (1) itself. This feature eliminates mechanical stresses that are typically subjected to the package during conventional forming processes. Consequently, the package robustness and reliability is greatly enhanced.

Another inherent feature of this invention is [[its]] the relatively thicker base material compared to other corresponding products in the market. This, coupled with the ~~'heat sinks'~~ heat sinks, greatly improves the package's ability to dissipate heat. Higher current or power ~~could~~ can also be applied to the devices to yield better performance.

SURFACE MOUNT OPTOELECTRONIC COMPONENT

ABSTRACT

The invention relates to a surface mount optoelectronic component. A thick, electrically conductive material [[(1)]] is used to serve as [[the]] a base material for the assembly. An opaque plastic material [[(2)]] is used to provide [[the]] housing for the whole component. A cavity [[(5)]] formed on [[the]] a top surface of the optoelectronic component is designed within the plastic material. An optoelectronic chip [[(3)]] is mounted within this cavity. This cavity is filled with a hard transparent or translucent resin material so that optical radiation may be transmitted or received via this window. Electrical connection(s) between the chip and the base material is/are provided by a metallic wire (4). Subsequent connections to [[the]] external sub-systems, such as PCBs, are provided by the base material itself. No extra mechanical forming processes are necessary to create the connections. The base material extends all the way from [[the]] a middle portion to [[the]] a bottom [[(8)]] surface of the optoelectronic component, and to one of the side ~~walls (7); until the extend of~~ surfaces, ultimately extending and protruding outside the package. The bottom surface ~~(8) will be~~ is used for connection when a top illuminator is required. Alternatively, one of the side surfaces [[(7)]] could be used for connection [[if]] when the optoelectronic component is used as a side illuminator.

~~The Most Illustrative Drawing: Figure 1A~~